Staff Bridge Branch

Revised October 1998

Pontis Bridge Inspection Coding Guide

Colorado Department of Transportation
Staff Bridge Branch
4201 East Arkansas Avenue
Room 330
Denver, Colorado 80222-3400

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Introduction

The Pontis Bridge Inspection Coding Guide was developed by the Staff Bridge Branch of the Colorado Department of Transportation. The July 1997 revision was made with input from CDOT bridge inspectors who had been performing bridge inspections using Pontis for approximately four years. The revision includes cross references to the General Comments and Definitions necessary to provide for uniform inspection reports from various bridge inspectors.

This Colorado version is intended to supplement the AASHTO Guide for Commonly Recognized (CoRe) Structural Elements with clarifying information and additional elements unique to Colorado bridges and structures. If conflicts occur between the guides, the AASHTO guide governs.

For comments or questions concerning this coding guide, please contact the Bridge Management Unit at 303/757-9187 or write to:

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Element Index

Deck

12 -**5**- Concrete Deck - Bare
13 -**5**- Concrete Deck - Unprotected w/AC Overlay
14 -**5**- Concrete Deck - Protected w/AC Overlay
18 -**5**- Concrete Deck - Protected w/Thin Overlay
22 -**5**- Concrete Deck - Protected w/Rigid Overlay
23*-**5**- Concrete Deck - Bare Protected w/Coated Bars
24*-**5**- Concrete Deck - Thin Overlay Protected w/Coated Bars
25*-**5**- Concrete Deck - Rigid Overlay Protected w/Coated Bars
26 -**5**- Concrete Deck - AC Overlay Protected w/Coated Bars
27 -**5**- Concrete Deck - Protected w/Cathodic Protection
28 -**5**- Open Grid - Steel Deck
29 -**5**- Concrete Filled Grid - Steel Deck
30 -**5**- Corrugated/Orthotropic/Etc. Deck
31 -**4**- Timber Deck
32 -**4**- Timber Deck - w/AC Overlay
35*-**5**- Precast Panel Concrete Deck - Bare
36*-**5**- Precast Panel Concrete Deck - Protected w/AC Overlay
38 -**5**- Concrete Slab - Bare
39 -**5**- Concrete Slab - Unprotected w/AC Overlay
40 -**5**- Concrete Slab - Protected w/AC Overlay
44 -**5**- Concrete Slab - Protected w/Thin Overlay
48 -**5**- Concrete Slab - Protected w/Rigid Overlay
52 -**5**- Concrete Slab - Protected w/Coated Bars
53 -**5**- Concrete Slab - Protected w/Cathodic Protection
54 -**4**- Timber Slab
55 -**4**- Timber Slab - w/AC Overlay
60*-**5**- Deck - Railroad

Superstructure

101 -**4**- Steel - Closed Web/Box Girder - Unpainted
102 -**5**- Steel - Closed Web/Box Girder - Painted
104 -**4**- P/S Concrete - Closed Web/Box Girder
105 -**4**- Concrete - Closed Webs/Box Girder
106 -**4**- Steel - Open Girder - Unpainted
107 -**5**- Steel - Open Girder - Painted
109 -**4**- P/S Concrete - Open Girder
110 -**4**- Concrete - Open Girder
111 -**4**- Timber - Open Girder
112 -**4**- Steel - Stringer - Unpainted
113 -**5**- Steel - Stringer - Painted
115 -**4**- P/S Concrete - Stringer
116 -**4**- Concrete - Stringer
117 -**4**- Timber - Stringer
120 -**4**- Steel - Bottom chord Through Truss - Unpainted
121 -**5**- Steel - Bottom chord Through Truss - Painted

125 -**4**- Steel - Through Truss excluding Bottom Chord - Unpainted
126 -**5**- Steel - Through Truss excluding Bottom Chord - Painted
130 -**4**- Steel - Deck Truss - Unpainted
131 -**5**- Steel - Deck Truss - Painted
135 -**4**- Timber - Truss/Arch
140 -**4**- Steel - Arch - Unpainted
141 -**5**- Steel - Arch - Painted
143 -**4**- P/S Concrete - Arch
144 -**4**- Concrete - Arch
145 -**4**- Arch - Other/Stone Masonry
146 -**4**- Steel - Cable not embedded in concrete (Uncoated)
147 -**5**- Steel - Cable not embedded in concrete (Coated)
151 -**4**- Steel - Floor Beam - Unpainted
152 -**5**- Steel - Floor Beam - Painted
154*-**4**- P/S Concrete - Floor Beam
155 -**4**- Concrete - Floor Beam
156 -**4**- Timber - Floor Beam
160 -**4**- Steel - Pin and Hanger Assembly - Unpainted
161 -**5**- Steel - Pin and Hanger Assembly - Painted

Substructure
201 -**4**- Steel - Column or Pile Extension - Unpainted
202 -**5**- Steel - Column or Pile Extension - Painted
204 -**4**- P/S Concrete - Column or Pile Extension
205 -**4**- Concrete - Column or Pile Extension
206 -**4**- Timber - Column or Pile Extension
210 -**4**- Concrete - Pier Wall
211 -**4**- Other - Pier Wall
215 -**4**- Concrete - Abutment
216 -**4**- Timber - Abutment
217 -**4**- Other - Abutment
220 -**4**- Concrete - Submerged Pile Cap/Footing
221*-**4**- Concrete - Pile Cap/Footing
225 -**4**- Steel - Submerged Pile - Unpainted
226 -**4**- P/S Concrete - Submerged Pile
227 -**4**- Concrete - Submerged Pile
228 -**4**- Timber - Submerged Pile
230 -**4**- Steel - Cap - Unpainted
231 -**5**- Steel - Cap - Painted
233 -**4**- P/S Concrete - Cap
234 -**4**- Concrete - Cap
235 -**4**- Timber - Cap

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240 -**4**- Steel - Culvert
241 -**4**- Concrete - Culvert
242 -**4**- Timber - Culvert
243 -**4**- Other - Culvert

Miscellaneous

300 -**3**- Strip Seal Expansion Joint
301 -**3**- Pourable Joint Seal
302 -**3**- Compression Joint Seal
304 -**3**- Open Expansion Joint (including non-sealed sliding plate joints)
305*-**3**- Elastomeric Flex-type Joint
306*-**3**- Asphaltic Plug Expansion Device
307*-**3**- Modular Expansion Joint
308*-**3**- Construction/Non-Expansion Joint
309*-**3**- Elastomeric Bearing with Teflon
310 -**3**- Elastomeric Bearing
311 -**3**- Moveable Bearing (Roller, Sliding, etc.)
313 -**3**- Fixed Bearing
314 -**3**- Pot Bearing
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320 -**4**- P/S Concrete - Approach Slab
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335*-**3**- Culvert Headwalls
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338*-**4**- Curbs/Sidewalks (Concrete)
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340*-**3**- Concrete Coating (Superstructure)
341*-**3**- Concrete Coating (Substructure)
342*-**4**- Sign Attachment to Bridge
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350*-**4**- Tunnel (Formed Concrete Lined)
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353*-**4**- Tunnel (Shotcrete Lined)

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362 -**3**- Traffic Impact (Superstructure)
370*-**3**- Traffic Impact (Substructure)
371*-**3**- Traffic Impact (Deck)
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373*-**4**- Pack Rust (Substructure)
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Channel/Roadway Alignment/General Remarks

501*- Channel Condition
502*- Channel Protection Material and Condition
504*- Bank Condition
505*- Debris
510*- Waterway Adequacy
520*- Approach Roadway Alignment
600*- General Remarks

The asterisk which follows the Element number or SmartFlag number indicates it was created by CDOT. The bold number indicates the number of condition states.

General Comments and Definitions

Rust Codes (R Codes)

R1 = Peeling of the paint, pitting, surface rust, etc., no measurable section loss.
R2 = Flaking, minor section loss (< 10% thickness loss).
R3 = Flaking, swelling, mod section loss (10% < thickness loss <30%).
R4 = Heavy section loss (> 30% thickness loss), may have holes through base metal.

Concrete Scaling Codes (S Codes)

S1 = Light scale up to 1/4" deep.
S2 = Moderate scale up to 1/2" deep with agg. exposed.
S3 = Heavy scale up to 1" deep with some agg. loose or missing.
S4 = Critical scale greater than 1" deep with reinforcing bars exposed and general disintegration of the concrete.

GCD01 - **Timber Girders and Stringers:** When reporting quantities in the various condition states, the entire timber girder or stringer length in the worst condition state is to be reported per girder or stringer. For example, if the girder or stringer is 23' long, the reporting quantity is 23' in the worst condition state contained within that girder or stringer.

When timber girders or stringers enter Condition State 3 or 4 and have been repaired, they revert back to Condition State 2. However, **when 25% of the total number of girders or stringers are split, cracked, OR repaired** then all of those girders or stringers shall be listed in Condition State 4 and remain there along with any new split, cracked, or repaired girders or stringers. **When this occurs, a new load rating based on reduced allowable stresses is required - submit the structure folder to the rating unit for evaluation.**

Check - Separation of wood fibers along the grain but not completely through the section.
Split - Separation of wood fibers (can be tight) that extends completely through the section but does not extend to the top or bottom. Usually starts at the ends.
Crack - Separation of wood fibers through the section extending to the top or bottom fibers.

GCD02 - Bridges with **approach slabs** will have a quantity for the type of joint between the abutment backwall and the approach slab. Also, approach slabs that are on "sleeper slabs" at the end away from the bridge will have a quantity for the type of joint over the "sleeper slab". This joint is between the approach slab and the concrete

roadway pavement. If there is a question about there being a "sleeper slab" you should refer back to the plans, if plans are not available, then treat it as not having a "sleeper slab". The **total quantity** of approach slabs **is usually two**, however there may be more.

Approach spans that cannot be inspected shall be coded and treated as an approach slab. The **total quantity is usually two**, but not greater than four (for parallel bridges with a closed median with one structure number). When approach spans are accessible, the appropriate elements shall be coded and quantities reported. The number of spans for the bridge include approach spans which are accessible.

Railroad bridges with approach slabs which are covered with ballast that cannot be inspected should not have the approach slab element coded. Mention the existence of the approach slab in the abutment element comment field. 320 321

GCD03 - **Open Spandrel Concrete and Steel Arches:** Treat as a truss with panels (Refer to GCD16). The caps on top of the spandrels are to be treated as floor beams and the spandrels are to be treated as verticals. 140 141 143 144

GCD04 - When **pulpits or saddles** have been added to restore the bearing area, the condition of the bearing may be restored to Condition State 1, however the damaged portion of the girder will continue to be reported. The pulpit or saddle should be coded as Element 313 Fixed Bearing. Do not count the original bearing if a pulpit or saddle has been placed beneath the girder. 313

GCD05 - Section loss in **steel components** (painted or unpainted) which have been painted or repainted and protected shall be placed in the painted condition state represented by its' active corrosion unless the load capacity rating is affected. An unpainted element with only the ends painted will become the painted element only for the length painted since the paint requires maintenance. A steel component with section loss which has been painted cannot be placed into a higher condition state than Condition State 2 unless the steel section has been restored.

GCD06 - **Pier Columns and Pier Walls:** Vertical substructure units less than 6' wide are considered columns. Vertical substructure units 6' and wider are considered walls (including 6' diameter and wider cylindrical shapes). Variable width walls shall be measured at the widest portion as determined by the plans, excluding the cap. 205 210

GCD07 - **SmartFlags** identify and attempt to quantify and note a deteriorated condition. They are to be used whenever the condition is noted.

GCD08 - The condition of an **overlaid deck** without documentation of the repair shall be coded the same as it was prior to the overlay unless the deterioration was limited only to the asphalt (i.e. rutting or wear). Indicate whether the **asphalt patches are due to deck deterioration or asphalt deterioration**, i.e. rutting, in the deck element comments.

GCD09 - **Rigid frame structures** (which may or may not have girders) shall be considered bridges, not culverts. They shall have abutments and probably a concrete slab element. Some slabs will have fill on them. If the fill has problems, the slab element shouldn't be downgraded. The slab under fill will remain a Condition State 1 and SmartFlag 359 Soffit of Concrete Decks and Slabs will be used to document slab bottom surface deterioration. In general, when the slab bottom surface deterioration enters Condition State 3, the slab element may be lowered to Condition State 2, however it is left to the inspector to add verbiage to indicate why the particular condition state was used.

GCD10 - **Concrete Box Culverts** will always have a bottom slab (floor). 241

GCD11 - A **three sided structure** will be coded as a Concrete Slab (CS) bridge.

GCD12 - **Timber and steel abutments with piles** shall have the piles coded as piles and the caps coded as applicable cap elements. The abutment element is the structural component which retains the approach roadway from the ground line to the roadway.

GCD13 - **New Pontis elements** will not be created unless the new element were to affect more than two percent of the total inventory where the existing elements do not specifically address a particular material or condition.

GCD14 - The **"CDOT SUGGESTED CONDITION STATES FOR PERCENT LOSS OF BEARING AREA"** is coded for the element where the bearing loss has occurred, i.e. superstructure, substructure, or both.

GCD15 - If there are **no comments for Element 510 Waterway Adequacy or Element 520 Approach Roadway Alignment**, remove the elements from the report. 510 520

GCD16 - **One panel length** is the minimum reporting length (**Min Rpt Lgth**) for a **steel through truss**, **steel deck truss**, and **timber truss** (Elements 125, 126, 130, 131, and 135). Refer to GCD03 for Elements 140, 141, 143, and 144.

GCD17 - Use Element 205 Concrete Column or Pile Extension for spill-through abutments when **3' of the column is exposed** beneath the bottom of the abutment. Spill-through abutments on columns are to be reported as Element 215 Concrete - Abutment. If sheet piling, backing planks, or other materials have been added to retain the approach roadway after construction, mention it in the comments for the abutment. 205 215

GCD18 - Count each **culvert longitudinal crack** with efflorescence as 1' in Condition State 2 and those with rust as 1' in Condition State 3. 241

GCD19 - Comments for **culvert aprons** shall be included in Element 502 Channel Protection Material and Condition. 241

GCD20 - **Delineated columns on piers** should be coded as columns unless the delineated column width is greater than 6'. The delineated cap on a pier should be coded as a cap. 205 210 234

GCD21 - The minimum reporting length for damage limited to the joint is the **section length of elastomeric flex-type joint**. For joint anchorage zone damage, the reporting length is the sum of the damage lengths and is a multiple of the section length (say the section length is 6', the damage length reported will be 6', 12', 18'...). 305

GCD22 - For **metal bridge railing with any coated components**, use Element 334 Metal Bridge Railing (Coated). 330 334

GCD23 - Flex beam rail attached to timber posts in fill over a culvert is usually considered to be a roadway railing. **Railing with steel or timber posts in the fill attached to the structure is considered to be bridge railing** (Element 333 Miscellaneous - Bridge Railing (Other) for the timber posts). 330 333 334

GCD24 - The **length of culvert inspected and reported** shall be to the ROW boundary or other known limits of CDOT or entity ownership. 240 241 242 243

GCD25 - **Report the height of fill on bridges and culverts** and write it on the inventory sheet so NBI Item66T can be appropriately coded. 38 52 240 241 242 243

GCD26 - The condition noted on the exterior of **closed web/box girder structures where there is no access for inspection** should be assumed to exist on the interior components, unless the condition is limited only to the exterior.

GCD27 - **Prestressed double-tee** (twin-tee) girders shall be counted as two girders. The reported length shall be per web. 109

GCD28 - **Timber girders or stringers which have been doubled** for repair shall be designated with an apostrophe, e.g. Girders E and E'. The reported length of girder shall not be doubled. 111 117

Bold lettering *has been added to the Pontis elements to emphasize key words and to ease comparison between the condition states.*

Ignore the element description language with the ***overstrike*** *font.*

The ***information contained in the tables*** *for certain Pontis elements provides clarification of the condition states. The information contained in the tables supersedes the condition state language.*